Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL GUIDELINE CLEARINGHOUSE

General

Guideline Title

Faltering growth: recognition and management of faltering growth in children.

Bibliographic Source(s)

National Guideline Alliance. Faltering growth: recognition and management of faltering growth in children. London (UK): National Institute for Health and Care Excellence (NICE); 2017 Sep 27. 23 p. (NICE guideline; no. 75).

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

NEATS Assessment

National Guideline Clearinghouse (NGC) has assessed this guideline's adherence to standards of trustworthiness, derived from the Institute of Medicine's report Clinical Practice Guidelines We Can Trust.

= Poor = Fair = Good = Very Good = Excellent

Assessment	Standard of Trustworthiness
YES	Disclosure of Guideline Funding Source
	Disclosure and Management of Financial Conflict of Interests
	Guideline Development Group Composition
YES	Multidisciplinary Group
YES	Methodologist Involvement

▮▮▮▮▮	Patient and Public Perspectives
	Use of a Systematic Review of Evidence
▮▮▮▮▮	Search Strategy
▮▮▮▮▮	Study Selection
▮▮▮▮▮	Synthesis of Evidence
	Evidence Foundations for and Rating Strength of Recommendations
▮▮▮▮▮	Grading the Quality or Strength of Evidence
▮▮▮▮▮	Benefits and Harms of Recommendations
▮▮▮▮▮	Evidence Summary Supporting Recommendations
▮▮▮▯▯	Rating the Strength of Recommendations
▮▮▮▮▯	Specific and Unambiguous Articulation of Recommendations
▮▮▮▮▮	External Review
▮▮▮▮▮	Updating

Recommendations

Major Recommendations

Note from the National Guideline Clearinghouse (NGC): This guideline was developed by the National Guideline Alliance (NGA) on behalf of the National Institute for Health and Care Excellence (NICE). See the "Availability of Companion Documents" field for the full version of this guidance and related appendices.

The wording used in the recommendations in this guideline (for example, words such as 'offer' and 'consider') denotes the certainty with which the recommendation is made (the strength of the recommendation) and is defined at the end of the "Major Recommendations" field.

Weight Loss in the Early Days of Life

Some weight loss in the first days after birth (referred to in this guideline as the early days of life) is normal and usually relates to body fluid adjustments. Sometimes there may be reason for concern about weight loss in the early days of life, which may need assessment and intervention. For this reason weight loss in the early days of life is dealt with separately in this guideline from concerns about inadequate weight gain in older infants and children, which is often related to nutritional intake.

Be aware that:

- It is common for infants to lose some weight during the early days of life
- This weight loss usually stops after about 3 or 4 days of life
- Most infants have returned to their birth weight by 3 weeks of age.

If infants in the early days of life lose more than 10% of their birth weight:

- Perform a clinical assessment, looking for evidence of dehydration, or of an illness or disorder that might account for the weight loss
- Take a detailed history to assess feeding (see NICE's guideline on postnatal care up to 8 weeks after birth)
- Consider direct observation of feeding
- Ensure observation of feeding is done by a person with appropriate training and expertise (for example, in relation to breastfeeding and bottle feeding)
- Perform further investigations only if they are indicated based on the clinical assessment.

Provide feeding support (see recommendations in NICE's guideline on postnatal care up to 8 weeks after birth) if there is concern about weight loss in infants in the early days of life, for example if they have lost more than 10% of their birth weight.

If infants lose more than 10% of their birth weight in the early days of life, or they have not returned to their birth weight by 3 weeks of age, consider:

- Referral to paediatric services if there is evidence of illness, marked weight loss, or failure to respond to feeding support (see recommendations in NICE's guideline on postnatal care up to 8 weeks after birth)
- When to reassess if not referred to paediatric services.

If an infant loses more than 10% of their birth weight in the early days of life, measure their weight again at appropriate intervals depending on the level of concern, but no more frequently than daily.

Be aware that supplementary feeding with infant formula in a breastfed infant may help with weight gain, but often results in cessation of breastfeeding.

If supplementation with an infant formula is given to a breastfed infant:

- Support the mother to continue breastfeeding
- Advise expressing breast milk to promote milk supply and
- Feed the infant with any available breast milk before giving any infant formula.

Faltering Growth After the Early Days of Life

Thresholds

Consider using the following as thresholds for concern about faltering growth in infants and children (a centile space being the space between adjacent centile lines on the UK WHO growth charts):

- A fall across 1 or more weight centile spaces, if birthweight was below the 9th centile
- A fall across 2 or more weight centile spaces, if birthweight was between the 9th and 91st centiles
- A fall across 3 or more weight centile spaces, if birthweight was above the 91st centile
- When current weight is below the 2nd centile for age, whatever the birthweight.

Measurement of Weight and Height or Length

If there is concern about faltering growth (for example, based on the criteria in the previous recommendation):

- Weigh the infant or child
- Measure their length (from birth to 2 years old) or height (if aged over 2 years)
- Plot the above measurements and available previous measurements on the UK WHO growth charts to assess weight change and linear growth over time.

If there are concerns about an infant's length or a child's length or height, if possible obtain the biological parents' heights and work out the mid-parental height centile. If the child's length or height centile is

below the range predicted from parental heights (more than 2 centile spaces below the mid-parental centile) be aware this could suggest undernutrition or a primary growth disorder.

If there is concern about faltering growth or linear growth in a child over 2 years of age, determine the body mass index (BMI) centile:

- Using the UK WHO centiles and the accompanying BMI centile 'look-up chart' or
- By calculating the BMI (weight in kg/height in metres squared) and plotting this on the BMI centile chart .

Then:

- If the BMI is below the 2nd centile, be aware this may reflect either undernutrition or a small build.
- If the BMI is below the 0.4th centile, this suggests probable undernutrition that needs assessment and intervention.

Record all growth measurements in the parent- or carer-held Personal Child Health Record.

Assessment

If there is concern about faltering growth:

- Perform a clinical, developmental and social assessment
- Take a detailed feeding or eating history
- Consider direct observation of feeding or meal times
- Consider investigating for:
  - Urinary tract infection (follow the principles of assessment in NICE's guideline on urinary tract infection in under 16s)
  - Coeliac disease, if the diet has included gluten-containing foods (follow the principles of assessment in the NGC summary of the NICE guideline Coeliac disease: recognition, assessment and management)
- Perform further investigations only if they are indicated based on the clinical assessment.

If observation of eating or feeding is needed because of concern about faltering growth, ensure this is done by a person with appropriate training and expertise.

Be aware that the following factors may be associated with faltering growth:

- Preterm birth
- Neurodevelopmental concerns
- Maternal postnatal depression or anxiety.

Recognise that in faltering growth:

- A range of factors may contribute to the problem, and it may not be possible to identify a clear cause
- There may be difficulties in the interaction between an infant or child and the parents or carers that may contribute to the problem, but this may not be the primary cause.

Based on the feeding history and any direct observation of feeding, consider whether any of the following are contributing to faltering growth in milk-fed infants:

- Ineffective suckling in breastfed infants
- Ineffective bottle feeding
- Feeding patterns or routines being used
- The feeding environment
- Feeding aversion
- Parent/carer–infant interactions
- How parents or carers respond to the infant's feeding cues

- Physical disorders that affect feeding.

Based on the feeding history and any direct observation of mealtimes, consider whether any of the following are contributing to faltering growth:

- Mealtime arrangements and practices
- Types of foods offered
- Food aversion and avoidance
- Parent/carer–child interactions, for example responding to the child's mealtime cues
- Appetite, for example a lack of interest in eating
- Physical disorders that affect feeding.

Consider asking the parents or carers of infants and children with faltering growth to keep a diary recording food intake (types and amounts) and mealtime issues (for example, settings, behaviour) to help inform management strategies and assess progress.

Be aware that investigations (other than those recommended in the first recommendation in the above) are unlikely to reveal an underlying disorder in a child with faltering growth who appears well with no other clinical concerns.

If a child with faltering growth develops new clinical symptoms or signs after the initial assessment, reconsider whether investigations are needed.

Interventions for Faltering Growth

Together with parents and carers, establish a management plan with specific goals for every infant or child where there are concerns about faltering growth. This plan could include:

- Assessments or investigations
- Interventions
- Clinical and growth monitoring
- When reassessment to review progress and achievement of growth goals should happen.

Provide feeding support (see recommendations in NICE's guideline on postnatal care up to 8 weeks after birth) if there is concern about faltering growth in the first weeks of life. Consider whether such feeding support might be helpful in older milk-fed infants, including those having complementary solid foods.

Be aware that while supplementary feeding with infant formula may increase weight gain in a breastfed infant if there is concern about faltering growth, it often results in cessation of breastfeeding.

If supplementation with an infant formula is given to a breastfed infant because of concern about faltering growth after the early days of life:

- Support the mother to continue breastfeeding
- Advise expressing breast milk to promote milk supply and
- Feed the infant with any available breast milk before giving any infant formula.

When there are concerns about faltering growth, discuss the following, as individually appropriate, with the infant's or child's parents or carers:

- Encouraging relaxed and enjoyable feeding and mealtimes
- Eating together as a family or with other children
- Encouraging young children to feed themselves
- Allowing young children to be 'messy' with their food
- Making sure feeds and mealtimes are not too brief or too long
- Setting reasonable boundaries for mealtime behaviour while avoiding punitive approaches
- Avoiding coercive feeding
- Establishing regular eating schedules (for example 3 meals and 2 snacks in a day).

If necessary, based on the assessment, advise on food choices for infants and children that:

- Are appropriate to the child's developmental stage in terms of quantity, type and food texture
- Optimise energy and nutrient density.

In infants or children who need a further increase in the nutrient density of their diet beyond that achieved through advice on food choices, consider:

- Short-term dietary fortification using energy-dense foods
- Referral to a paediatric dietitian.

Advise the parents or carers of infants or children with faltering growth that drinking too many energy-dense drinks, including milk, can reduce a child's appetite for other foods.

Consider a trial of an oral liquid nutritional supplement for infants or children with continuing faltering growth despite other interventions (see previous recommendations).

Regularly reassess infants and children receiving an oral nutritional supplement for faltering growth to decide if it should be continued. Take into account:

- Weight change
- Linear growth
- Intake of other foods
- Tolerance
- Adherence
- The views of parents or carers.

Only consider enteral tube feeding for infants and children with faltering growth when:

- There are serious concerns about weight gain and
- An appropriate specialist multidisciplinary assessment for possible causes and contributory factors has been completed and
- Other interventions have been tried without improvement.

If enteral tube feeding is to be used in an infant or child with faltering growth, make a plan with appropriate multidisciplinary involvement for:

- The goals of the treatment (for example, reaching a specific weight target)
- The strategy for its withdrawal once the goal is reached (for example, progressive reduction together with strategies to promote oral intake).

Monitoring

If there are concerns about faltering growth (see recommendation above), measure the weight at appropriate intervals taking account of factors such as age and the level of concern, but usually no more often than:

- Daily if less than 1 month old
- Weekly between 1 and 6 months old
- Fortnightly between 6 and 12 months
- Monthly from 1 year of age.

Monitor weight if there are concerns about faltering growth (see recommendation above), but be aware that weighing children more frequently than is needed (see previous recommendation) may add to parental anxiety (for example, minor short-term changes may cause unnecessary concern).

Be aware that weight loss is unusual except in the early days of life, and may be a reason for increased concern and more frequent weighing than is recommended (see previous recommendation).

If there are concerns about faltering growth monitor length or height at intervals, but no more often than

every 3 months.

Referral

If an infant or child with faltering growth has any of the following discuss with, or refer to, an appropriate paediatric specialist care service:

- Symptoms or signs that may indicate an underlying disorder
- A failure to respond to interventions delivered in a primary care setting
- Slow linear growth or unexplained short stature (see recommendation above)
- Rapid weight loss or severe undernutrition
- Features that cause safeguarding concerns (see the NICE guideline on child maltreatment).

Organisation of Care

Ensure there is a pathway of care for infants and children where there are concerns about faltering growth or weight loss in the early days of life that:

- Clearly sets out the roles of healthcare professionals in primary and secondary care settings
- Establishes and makes clear the process for referral to and coordination of specialist care in the pathway.

Provide community-based care for infants and children where there are faltering growth concerns or weight loss in the early days of life with a team (the 'primary care team') that includes, for example:

- A midwife
- A health visitor
- A general practitioner (GP).

Ensure that the primary care team has access to the following healthcare professionals with expertise relevant to faltering growth:

- Infant feeding specialist
- Consultant paediatrician
- Paediatric dietitian
- Speech and language therapist with expertise in feeding and eating difficulties
- Clinical psychologist
- Occupational therapist.

Consider identifying a lead healthcare professional to coordinate care and to act as the first point of contact for parents of children with faltering growth, for example if several professionals are involved.

Information and Support

Recognise the emotional impact that concerns about faltering growth or weight loss in the early days can have on parents and carers and offer them information about available:

- Professional support
- Peer support.

Follow the principles in the NICE guideline on patient experience in adult NHS services in relation to communication (including different formats and languages), information and shared decision-making.

Provide information on faltering growth or weight loss in the early days of life, to parents or carers that is:

- Specific to them and their child
- Clearly explained and understandable to them

Spoken and in writing.

If there is concern about faltering growth in an infant or child or weight loss in the early days of life, discuss with the parents or carers:

The reasons for the concern, and how the growth measurements are interpreted
Any worries or issues they may have
Any possible or likely causes or factors that may be contributing to the problem
The management plan (see recommendation above).

Definitions

Strength of Recommendations

Some recommendations can be made with more certainty than others. The Committee makes a recommendation based on the trade-off between the benefits and harms of an intervention, taking into account the quality of the underpinning evidence. For some interventions, the Committee is confident that, given the information it has looked at, most patients would choose the intervention. The wording used in the recommendations in this guideline denotes the certainty with which the recommendation is made (the strength of the recommendation).

Recommendations That Must (or Must Not) Be Followed

The Committee usually uses 'must' or 'must not' only if there is a legal duty to apply the recommendation. Occasionally the Committee uses 'must' (or 'must not') if the consequences of not following the recommendation could be extremely serious or potentially life threatening.

Recommendations That Should (or Should Not) Be Followed – a 'Strong' Recommendation

The Committee uses 'offer' (and similar words such as 'refer' or 'advise') when confident that, for the vast majority of patients, an intervention will do more good than harm, and be cost effective. Similar forms of words (for example, 'Do not offer…') are used when the Committee is confident that an intervention will not be of benefit for most patients.

Recommendations That Could Be Followed

The Committee uses 'consider' when confident that an intervention will do more good than harm for most patients, and be cost effective, but other options may be similarly cost effective. The choice of intervention, and whether or not to have the intervention at all, is more likely to depend on the patient's values and preferences than for a strong recommendation, and so the healthcare professional should spend more time considering and discussing the options with the patient.

Clinical Algorithm(s)

A National Institute for Health and Care Excellence (NICE) interactive flowchart titled "Faltering growth overview" is provided on the NICE Web site .

Scope

Disease/Condition(s)

Faltering growth

Guideline Category

Evaluation

Management

Clinical Specialty

Family Practice

Pediatrics

Intended Users

Advanced Practice Nurses

Health Care Providers

Nurses

Patients

Physician Assistants

Physicians

Social Workers

Guideline Objective(s)

To develop a clinical guideline on the recognition and management of faltering growth in children

Target Population

Infants and preschool children in whom growth concerns have been raised, through either routine monitoring or professional or parental concern

Note: The following subgroups have been identified as needing specific consideration: infants and preschool children

Who were born prematurely
Who were born with intrauterine growth restriction (IUGR)
With a specific disorder known to cause faltering growth, but only with regard to recognition of growth thresholds for concern

Interventions and Practices Considered

1. Recognition of normal vs abnormal weight loss in infants
2. Use of thresholds
3. Measurement of weight and height or length
4. Assessment, including
    - Clinical, developmental, and social assessment
    - Detailed feeding or eating history
    - Observation
    - Investigation for urinary tract infection (UTI) or coeliac disease
5. Consideration of causes
6. Interventions for faltering growth
    - Feeding support
    - Supplementation
7. Monitoring

8. Referral
9. Consideration of organisation of care
10. Information and support

Major Outcomes Considered

- Measurements of nutritional status (weight, length or height, head circumference, mid-arm circumference)
- Cognitive and motor development
- Continued breastfeeding
- Increased nutritional intake
- Health-related quality of life
- Parent or carer satisfaction
- Adherence to interventions
- Adverse effects of interventions
- Use of health services
- Hospital admission or readmission rates

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Searches of Unpublished Data

Description of Methods Used to Collect/Select the Evidence

Note from the National Guideline Clearinghouse (NGC): This guideline was developed by the National Guideline Alliance (NGA) on behalf of the National Institute for Health and Care Excellence (NICE). See the "Availability of Companion Documents" field for the full version of this guidance and related appendices.

Developing the Review Questions and Protocols

The 14 review questions developed for this guideline were based on the key areas identified in the guideline scope. They were drafted by the NGA, and refined and validated by the Guideline Committee.

The review questions were based on the following frameworks:

> Intervention reviews – using population, intervention, comparison and outcome (a population, intervention, comparator, outcome [PICO] framework)
> Reviews of diagnostic test or clinical prediction model accuracy – using population, diagnostic test (index tests), reference standard and target condition
> Qualitative reviews – using population, area of interest and themes of interest
> Prognostic reviews – using population, presence or absence of a risk factor, and outcome.

Full literature searches, critical appraisals and evidence reviews were completed for all review questions.

Searching for Evidence

Clinical Literature Searches

Systematic literature searches were undertaken to identify all published clinical evidence relevant to each review question.

Databases were searched using medical subject headings, free-text terms and study type filters where appropriate. Special consideration was given to search terms relating to early weight loss following birth to ensure that relevant studies were captured. Relevant search terms such as hypernatremia and dehydration were used in the searches as well as figures for the percentage of weight change that might cause concern. Where possible, searches were restricted to retrieve articles published in English. All searches were conducted in the following databases: Medline, EMBASE, Health Technology Assessments (HTA), Cochrane Central Register of Controlled Trials (CCTR), Cochrane Database of Systematic Reviews (CDSR), and Database of Abstracts of Reviews of Effects (DARE). Where relevant to specific review questions the following additional databases were also searched: PsycINFO, AMED (Allied and Complementary Medicine) and CINAHL (Cumulative Index to Nursing and Allied Health Literature). All searches were updated on 20th January 2017. Any studies added to the databases after this date (including those published prior to this date but not yet indexed) were not considered relevant for inclusion.

Search strategies were quality assured by cross-checking reference lists of relevant papers, analysing search strategies from other systematic reviews and asking Guideline Committee members to highlight key studies. All search strategies were also quality assured by an Information Scientist who was not involved in the development of the search. Details of the search strategies, including study type filters that were applied and databases that were searched, can be found in Appendix E.

All references suggested by stakeholders at the time of the scope consultation were considered for inclusion. During the scoping stage, searches were conducted for guidelines, health technology assessments, systematic reviews, economic evaluations and reports on biomedical databases and websites of organisations relevant to the topic. Formal searching for grey literature, unpublished literature and electronic, ahead-of-print publications was not routinely undertaken.

Health Economics Literature Searches

Systematic literature searches were also undertaken to identify relevant published health economic evidence. A broad search was conducted to identify health economic evidence relating to faltering growth in the following databases: NHS Economic Evaluation Database (NHS EED) and Health Technology Assessment (HTA). A broad search was also conducted to identify health economic evidence relating to faltering growth in the following databases with an economic search filter applied: Medline, Cochrane Central Register of Controlled Trials (CCTR) and EMBASE. Where possible, the search was restricted to articles published in English and studies published in languages other than English were not eligible for inclusion.

The search strategies for the health economic literature search are included in Appendix E. All searches were updated on 20th January 2017. Any studies added to the databases after this date (including those published prior to this date but not yet indexed) were not included unless specifically stated in the text.

Reviewing Research Evidence

Types of Studies and Inclusion and Exclusion Criteria

For most intervention reviews in this guideline, parallel randomised controlled trials (RCTs) were prioritised because they are considered the most robust type of study design that could produce an unbiased estimate of the intervention effects.

For diagnostic, clinical prediction rule or prevalence reviews, cross-sectional, retrospective or prospective cohort studies were considered for inclusion. For prognostic reviews, prospective and retrospective cohort and case-control studies were included.

For qualitative reviews, studies using focus groups, or structured or semi-structured interviews were

considered for inclusion. Survey data or other types of questionnaires were only included if they provided analysis from open-ended questions, but not if they reported descriptive quantitative data only. Where data from observational studies were included, the Committee agreed that the results for each outcome should be presented separately for each study and meta-analysis was not conducted.

The evidence was reviewed following the steps shown schematically in Figure 1 in the full version of the guideline:

> Potentially relevant studies were identified for each review question from the relevant search results by reviewing titles and abstracts. Full papers were then obtained.
> Full papers were reviewed against pre-specified inclusion and exclusion criteria to identify studies that addressed the review question in the appropriate population, as outlined in the review protocols (review protocols are included in Appendix D).

Specific Inclusions and Exclusions

The definitions of the faltering growth condition varied widely between studies. Often cases were only very loosely classified. The Committee therefore decided to include any study referring to a 'faltering growth' population of children even when it was unlikely that the definition would be specific enough to accurately identify all children generally considered to show faltering growth. The definitions were then extracted and the applicability of this was then taken into consideration when the evidence was discussed.

Infants showing early weight loss in the first days of life were treated as a separate group. For this group of infants the term 'faltering growth' would not usually be used. We therefore widened the search for this group to include terms such as 'feeding problem', 'weight losses' and others.

Throughout this guideline only evidence from high income countries (https://data.worldbank.org/income-level/high-income) was considered for inclusion. It was agreed that the reasons and interventions for faltering growth in middle and low income countries would not be generalisable to the NHS setting.

Number of Source Documents

See Appendix F: Summary of identified studies (see the "Availability of Companion Documents" field) for information on results of literature searches and the number of included and excluded studies for each review question, including economic article selection.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Overall Quality of Outcome Evidence in Grading of Recommendations Assessment, Development and Evaluation (GRADE)

Level	Description
High	Further research is very unlikely to change confidence in the estimate of effect.
Moderate	Further research is likely to have an important impact on confidence in the estimate of effect and may change the estimate.
Low	Further research is very likely to have an important impact on confidence in the estimate of effect and is likely to change the estimate.
Very Low	Any estimate of effect is very uncertain.

Methods Used to Analyze the Evidence

Meta-Analysis

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Note from the National Guideline Clearinghouse (NGC): This guideline was developed by the National Guideline Alliance (NGA) on behalf of the National Institute for Health and Care Excellence (NICE). See the "Availability of Companion Documents" field for the full version of this guidance and related appendices.

Reviewing Research Evidence

The evidence was reviewed following the steps shown schematically in Figure 1 in the full guideline:

Relevant studies were critically appraised using the appropriate checklist as specified in the NICE guidelines manual.
Key information was extracted on the study's methods, according to the factors specified in the protocols and results. These were presented in summary tables (in each review chapter) and evidence tables (in Appendix G).
Summaries of evidence were generated by outcome (included in the relevant review chapters) and were presented in Committee meetings (details of how the evidence was appraised is described in "Appraising the Quality of Evidence" below):

- Randomised studies: meta-analysis was carried out where appropriate and results were reported in Grading of Recommendations Assessment, Development and Evaluation (GRADE) profiles (for intervention reviews).
- Observational studies of interventions: data were presented as a range of values in GRADE profiles.
- Prognostic studies: data were presented as a range of values, usually in terms of the relative effect as reported by the authors.
- Prevalence studies: data were presented as a range of values, in terms of the absolute prevalence as reported by the authors.
- Diagnostic or clinical prediction rule studies: data were presented as measures of diagnostic test accuracy (sensitivity and specificity) and were presented in modified GRADE profiles.

For quality assurance of study identification, a 10% sample of the study searches were double checked by a second reviewer for the following review questions: normal weight loss in the early days of life, weight loss in the early days of life associated with adverse outcomes, thresholds for faltering growth, risk factors for faltering growth, non-nutritional interventions, monitoring and referral.

Any disagreements in study selection were resolved by discussion between the two reviewers. All drafts of reviews were checked by a second reviewer.

Method of Combining Clinical Studies

When planning reviews (protocols), the approaches followed for data synthesis were discussed and agreed with Committee. See Section 3.4 in the full version of the guideline for detailed information.

Appraising the Quality of Evidence

For intervention reviews, the evidence for outcomes from the included randomised controlled trials (RCTs) and observational studies were evaluated and presented using GRADE, which was developed by the international GRADE working group. For prognostic and prevalence reviews the quality of evidence was summarised on a per-study basis for each reported risk-factor or prevalence estimate.

The software developed by the GRADE working group (GRADEpro) was used to assess the quality of each outcome, taking into account individual study quality factors and the meta-analysis results. The clinical/economic evidence profile tables include details of the quality assessment and pooled outcome data, where appropriate, an absolute measure of intervention effect and the summary of quality of evidence for that outcome. In this table, the columns for intervention and control indicate summary measures of effect and measures of dispersion (such as mean and standard deviation or median and range) for continuous outcomes and frequency of events (n/N: the sum across studies of the number of patients with events divided by sum of the number of completers) for binary outcomes. Reporting or publication bias was only taken into consideration in the quality assessment and included in the clinical evidence profile tables if it was apparent.

The selection of outcomes for each review question was decided when each review protocol was discussed with the Guideline Committee. However, given the nature of most of the review questions included in this guideline many of which were not intervention reviews the categorisation of outcomes as critical and important did not follow the standard GRADE approach but could be related to which particular risk factor was important, whether sensitivity or specificity would be given more weight, or the outcome maximal weight loss in the early days was divided into three critical outcomes (what percentage of weight loss, when it occurred and when weight would be regained). The outcomes were selected by the Committee for a review question as critical for decision-making in a specific context and recorded in the relevant review protocol.

The evidence for each outcome in interventional reviews was examined separately for the quality elements listed and defined in Table 3 in the full version of the guideline. Each element was graded using the quality levels listed in Table 4 in the full version of the guideline.

The main criteria considered in the rating of these elements are discussed below. Footnotes were used to describe reasons for grading a quality element as having serious or very serious limitations. The ratings for each component were summed to obtain an overall assessment for each outcome (see the "Rating Scheme for the Strength of the Evidence" field).

The GRADE toolbox is designed for intervention reviews of RCTs and observational studies. For diagnostic accuracy, prognostic and prevalence reviews the evidence was assessed per study level.

Grading the Quality of Clinical Evidence

After results were pooled, the overall quality of evidence for each outcome was considered. The following procedure was adopted when using the GRADE approach:

- A quality rating was assigned based on the study design. For intervention reviews RCTs start as high, observational studies as moderate and uncontrolled case series as low or very low.
- The rating was then downgraded for the specified criteria: risk of bias (study limitations); inconsistency; indirectness; imprecision; and publication bias. These criteria are detailed below.
- Evidence from observational studies (which had not previously been downgraded) was upgraded if there was a large magnitude of effect or a dose-response gradient, and if all plausible confounding would reduce a demonstrated effect or suggest a spurious effect when results showed no effect.
- Each quality element considered to have 'serious' or 'very serious' risk of bias was rated down by 1 or 2 points respectively.
- The downgraded/upgraded ratings were then summed and the overall quality rating was revised. For example, all RCTs started as high and the overall quality became moderate, low or very low if 1, 2 or 3 points were deducted respectively.
- The reasons or criteria used for downgrading were specified in the footnotes.

The details of the criteria used for each of the main quality elements are discussed further in Section 3.5.1.1 in the full version of the guideline.

GRADE quality assessment was not performed for the reviews of prevalence, normal weight loss in the early days of life or for prognostic reviews not involving predictive accuracy. In these cases the quality of

evidence was informed by the assessment of risk of bias.

Assessing Clinical Significance (of Intervention Effects)

The Committee assessed the evidence by outcome in order to determine if there was, or potentially was, a clinically important benefit, a clinically important harm or no clinically important difference between interventions. To facilitate this, where possible, binary outcomes were converted into absolute risk differences (ARDs) using GRADEpro software: the median control group risk across studies was used to calculate the ARD and its 95% confidence interval (CI) from the pooled risk ratio. For continuous outcomes, the mean difference between the intervention and control arm of the trial was calculated. This was then assessed in relation to the default minimal important difference (MID) (0.5 times the median control group standard deviation).

The assessment of clinical benefit or harm, or no benefit or harm, was based on the agreed MID of the effect, taking into consideration the precision around the effect estimate.

This assessment was carried out by the Committee for each critical outcome, and an evidence summary table (used in the Committee meetings, but not presented in this guideline) was produced to compile the Committee's assessments of clinical importance per outcome, alongside the evidence quality and the uncertainty in the effect estimate (imprecision).

Assessing Clinical Significance (of Prognostic Effects or Clinical Prediction Models)

Absolute risk differences were not calculated for prognostic findings in this guideline. The Committee considered the size of the relative effects and whether this was large enough to constitute a sign or symptom predicting the outcome of interest. The usefulness of clinical prediction models, such as weight loss thresholds for concern, was judged by combining evidence about their accuracy with baseline risk to estimate the proportion who would be misclassified, taking into consideration the consequences of false positive or false negative classification.

Evidence Statements

Evidence statements summarise the key features of the clinical evidence. The wording of the evidence statements reflects the certainty or uncertainty in the estimate of effect.

The evidence statements for intervention reviews are presented by outcome, and encompass the following key features:

- The quality of the evidence (GRADE rating)
- The number of studies and the number of participants for a particular outcome
- An indication of the direction of effect (for example, if a treatment is clinically significant [beneficial or harmful] compared with another, or whether there is no difference between the tested treatments).

The evidence statements for prognostic, prediction model or prevalence reviews include the following:

- The quality of the evidence (using modified GRADE rating for prediction models, or otherwise based on the study level risk of bias)
- The number of studies and the number of participants for a particular risk factor, prediction model or prevalence estimate
- A summary of the effect size of the prognostic factor, magnitude of the prevalence estimate or accuracy of the prediction model.

Evidence of Cost-effectiveness

The aims of the health economic input to the guideline were to inform the Guideline Committee of potential economic issues related to the management of faltering growth to ensure that recommendations represented a cost-effective use of healthcare resources. Health economic evaluations aim to integrate data on healthcare benefits (ideally in terms of quality-adjusted life-years [QALYs]) with

the costs of different care options. In addition, the health economic input aimed to identify areas of high resource impact; recommendations which – while nevertheless cost-effective – might have a large impact on clinical commissioning group (CCG) or Trust finances and so need special attention.

The Committee prioritised a single economic model on service delivery where it was thought that economic considerations would be particularly important in formulating recommendations and a review of the health economic literature was undertaken. There were concerns in the Committee that their recommendations might represent a high resource impact, but the economic model suggested that savings in the healthcare system offset a large part of this impact. For economic evaluations, no standard system of grading the quality of evidence exists and included papers were assessed using the economic evaluations checklist as specified in the NICE guidelines manual.

Economic modelling was undertaken for a review question on monitoring suspected faltering growth. This was because it was thought that the Committee may want to make recommendations which were high resource impact, although the clinical evidence base did not support such recommendations. The Committee did not prioritise the health economic mode for this question as a lack of input data meant it could only function as a 'what if' analysis.

No economic analysis was undertaken for a question on interventions (nutritional or non-nutritional). While such an economic model might be valuable in deciding on the allocation of scarce NHS resources, no evidence was uncovered which might populate an economic model which meant that no model could be constructed.

No economic evaluation was undertaken for questions on risk factors, information and support, assessment, thresholds, differences between faltering growth and non-faltering growth or prevalence as it was agreed with the Committee that these reviews would focus primarily on the content and quality of information which is given to patients and clinicians respectively rather than whether the provision of such information represented a cost-effective use of NHS resources, which was thought to be clinically uncontroversial. Therefore these questions were not primarily about competing alternative uses for NHS resources and therefore were not considered suitable for economic analysis.

No economic analysis was undertaken for a question on referral to secondary care. This question was of a high health economic importance as the potential quality of life impact for misdiagnosing faltering growth and exposing a child to the potential harms of hospital is high, and potentially lifelong. However in order to perform a reasonable economic analysis on this question it would have been necessary to consider the cost-effectiveness of the treatment pathway for each possible reason to refer, some of which would be sensible referrals but – on further assessment – not turn out to be faltering growth. Some of these pathways have existing NICE guidance but some do not, which would have required de novo modelling (taking away resources from the main health economic guideline). For this question it was agreed with the Committee that health economic input would be limited to resource impact and analysis, with a full health economic evaluation being left until all possible referral pathways had been costed in other NICE Guidelines.

Methods Used to Formulate the Recommendations

Expert Consensus

Informal Consensus

Description of Methods Used to Formulate the Recommendations

Note from the National Guideline Clearinghouse (NGC): This guideline was developed by the National Guideline Alliance (NGA) on behalf of the National Institute for Health and Care Excellence (NICE). See the "Availability of Companion Documents" field for the full version of this guidance and related appendices.

Who Developed This Guideline?

A multidisciplinary Guideline Committee comprising healthcare professionals and researchers as well as lay members developed this guideline (see the list of group members and acknowledgements).

The Guideline Committee was convened by the NGA and chaired by Russell Peek in accordance with guidance from NICE. The group met every 4 to 6 weeks during the development of the guideline.

Staff from the NGA provided methodological support and guidance for the development process. The team working on the guideline included a guideline lead, a project manager, systematic reviewers, health economists, a statistician and information scientists. They undertook systematic searches of the literature, appraised the evidence, conducted meta-analysis and cost-effectiveness analysis where appropriate and drafted the guideline in collaboration with the group.

Developing Recommendations

Over the course of the guideline development process, the Guideline Committee was presented with:

- Evidence tables of the clinical and economic evidence reviewed from the literature: all evidence tables are in Appendix H
- Summary of clinical and economic evidence and quality assessment (as presented in Chapters 4 to 11)
- Forest plots (Appendix J)
- A description of the methods and results of the cost-effectiveness analysis undertaken for the guideline (Appendix L).

Recommendations were drafted on the basis of the group's interpretation of the available evidence, taking into account the balance of benefits, harms and costs between different courses of action. This was either done formally, in an economic model, or informally. Firstly, the net benefit over harm (clinical effectiveness) was considered, focusing on the critical outcomes, although most of the reviews in the guideline were outcome driven. When this was done informally, the group took into account the clinical benefits and harms when one intervention was compared with another. The assessment of net benefit was moderated by the importance placed on the outcomes (the group's values and preferences), and the confidence the group had in the evidence (evidence quality). Secondly, the group assessed whether the net benefit justified any differences in costs.

When clinical and economic evidence was of poor quality, conflicting or absent, the group drafted recommendations based on their expert opinion. The considerations for making consensus-based recommendations include the balance between potential harms and benefits, the economic costs or implications compared with the economic benefits, current practices, recommendations made in other relevant guidelines, patient preferences and equality issues. The group also considered whether the uncertainty was sufficient to justify delaying making a recommendation to await further research, taking into account the potential harm of failing to make a clear recommendation.

The wording of recommendations was agreed by the group and focused on the following factors:

- The actions healthcare professionals need to take
- The information readers need to know
- The strength of the recommendation (for example the word 'offer' was used for strong recommendations and 'consider' for weak recommendations)
- The involvement of patients (and their carers if needed) in decisions about treatment and care
- Consistency with NICE's standard advice on recommendations about drugs, waiting times and ineffective intervention.

The main considerations specific to each recommendation are outlined in the 'Recommendations and link to evidence' sections within each chapter.

Rating Scheme for the Strength of the Recommendations

Strength of Recommendations

Some recommendations can be made with more certainty than others, depending on the quality of the underpinning evidence. The Committee makes a recommendation based on the trade-off between the benefits and harms of a system, process or an intervention, taking into account the quality of the underpinning evidence. The wording used in the recommendations in this guideline denotes the certainty with which the recommendation is made (the strength of the recommendation).

Interventions That Must (or Must Not) Be Used

The Committee usually uses 'must' or 'must not' only if there is a legal duty to apply the recommendation. Occasionally the Committee uses 'must' (or 'must not') if the consequences of not following the recommendation could be extremely serious or potentially life threatening.

Interventions That Should (or Should Not) Be Used – a 'Strong' Recommendation

The Committee uses 'offer' (and similar words such as 'refer' or 'advise') when confident that, for the vast majority of people, a system, process or an intervention will do more good than harm, and be cost effective. Similar forms of words (for example, 'Do not offer…') are used when the Committee is confident that an intervention will not be of benefit for most people.

Interventions That Could Be Used

The Committee uses 'consider' when confident that a system, process or an intervention will do more good than harm for most people, and be cost effective, but other options may be similarly cost effective. The choice of intervention, and whether or not to have the intervention at all, is more likely to depend on the person's values and preferences than for a strong recommendation, and so the healthcare professional should spend more time considering and discussing the options with the person.

Cost Analysis

Refer to the "Economic evidence" and "Consideration of economic benefits and harms" sections in the full version of the guideline.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

This guidance is subject to a 6-week public consultation and feedback as part of the quality assurance and peer review of the document. All comments received from registered stakeholders are responded to in turn and posted on the National Institute for Health and Care Excellence (NICE) Web site when the pre-publication check of the full guideline occurs.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of evidence supporting the recommendations is not specifically stated.

The type of evidence supporting each review area is detailed in the full version of the guideline (see the "Availability of Companion Documents" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

- Based on the clinical and health economic evidence, the Committee concluded that health visitors and other services in the Community should be the first line approach for the care of infants and preschool children with faltering growth. The involvement of these healthcare professionals would not only benefit the child, but would also have a positive impact on the parents or carers, for example by helping to reduce levels of anxiety.
- The Committee discussed that information and support provided to parents and carers and the preschool child (where possible) is central to good clinical practice. Information should be individualised to each person, taking into account their circumstances. This includes consideration of whether there are any issues that may hinder an individual understanding of information or where special support needs have to be addressed (such as learning disabilities, mental health needs or physical disabilities). The focus of the information should be on the current condition of the child, but also on prognosis and future health.

Refer to the "Consideration of clinical benefits and harms" sections of the full version of the guideline (see the "Availability of Companion Documents" field) for details about benefits of specific interventions.

Potential Harms

- In infants and children without symptoms or signs of an underlying condition referral to secondary care may lead to unnecessary investigations (for example blood tests) or interventions that are not needed.
- False positive or false negative classification
- The Committee considered the benefits and harms of testing and assessment of infants and children with faltering growth. There are benefits to correctly identifying treatable causative conditions. Recognising that such underlying conditions are rare, the Committee highlighted the potential harms of invasive investigations and false positive results. In addition repeated testing can raise anxiety and delay appropriate intervention.

Refer to the "Consideration of clinical benefits and harms" sections of the full version of the guideline (see the "Availability of Companion Documents" field) for details about potential harms of specific interventions.

Qualifying Statements

Qualifying Statements

- The recommendations in this guideline represent the view of the National Institute for Health and Care Excellence (NICE), arrived at after careful consideration of the evidence available. When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility to make decisions appropriate to the circumstances of the individual, in

consultation with them and their families and carers or guardian.

- Local commissioners and providers of healthcare have a responsibility to enable the guideline to be applied when individual professionals and people using services wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with complying with those duties.
- Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

Implementation of the Guideline

Description of Implementation Strategy

Putting This Guideline into Practice

The National Institute for Health and Care Excellence (NICE) has produced tools and resources to help put this guideline into practice (see also the "Availability of Companion Documents" field).

Putting recommendations into practice can take time. How long may vary from guideline to guideline, and depends on how much change in practice or services is needed. Implementing change is most effective when aligned with local priorities.

Changes recommended for clinical practice that can be done quickly – like changes in prescribing practice – should be shared quickly. This is because healthcare professionals should use guidelines to guide their work – as is required by professional regulating bodies such as the General Medical and Nursing and Midwifery Councils.

Changes should be implemented as soon as possible, unless there is a good reason for not doing so (for example, if it would be better value for money if a package of recommendations were all implemented at once).

Different organisations may need different approaches to implementation, depending on their size and function. Sometimes individual practitioners may be able to respond to recommendations to improve their practice more quickly than large organisations.

Here are some pointers to help organisations put NICE guidelines into practice:

Raise awareness through routine communication channels, such as email or newsletters, regular meetings, internal staff briefings and other communications with all relevant partner organisations.
Identify things staff can include in their own practice straight away.
Identify a lead with an interest in the topic to champion the guideline and motivate others to support its use and make service changes, and to find out any significant issues locally.
Carry out a baseline assessment against the recommendations to find out whether there are gaps in current service provision.
Think about what data you need to measure improvement and plan how you will collect it. You may want to work with other health and social care organisations and specialist groups to compare current practice with the recommendations. This may also help identify local issues that will slow or prevent implementation.
Develop an action plan, with the steps needed to put the guideline into practice, and make sure it is ready as soon as possible. Big, complex changes may take longer to implement, but some may be quick and easy to do. An action plan will help in both cases.
For very big changes include milestones and a business case, which will set out additional costs,

savings and possible areas for disinvestment. A small project group could develop the action plan. The group might include the guideline champion, a senior organisational sponsor, staff involved in the associated services, finance and information professionals.

Implement the action plan with oversight from the lead and the project group. Big projects may also need project management support.

Review and monitor how well the guideline is being implemented through the project group. Share progress with those involved in making improvements, as well as relevant boards and local partners.

NICE provides a comprehensive programme of support and resources to maximise uptake and use of evidence and guidance. See the into practice pages for more information.

Also see Leng G, Moore V, Abraham S, editors (2014) Achieving high quality care – practical experience from NICE. Chichester: Wiley.

Implementation Tools

Clinical Algorithm

Patient Resources

Resources

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Living with Illness

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

National Guideline Alliance. Faltering growth: recognition and management of faltering growth in children. London (UK): National Institute for Health and Care Excellence (NICE); 2017 Sep 27. 23 p. (NICE guideline; no. 75).

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2017 Sep 27

Guideline Developer(s)

National Guideline Alliance - National Government Agency [Non-U.S.]

Source(s) of Funding

The National Institute for Health and Care Excellence (NICE) funds the National Guideline Alliance (NGA) and thus supported the development of this guideline.

Guideline Committee

Guideline Committee

Composition of Group That Authored the Guideline

Guideline Committee Members: Gordon Allan, General Practitioner; Shel Banks, Lay member; Rachel Bryant-Waugh, Consultant Clinical Psychologist; Anne Marie Frohock, Paediatric Dietitian; Annalou Louw, Speech and language therapist; Russell Peek (*Chair*), Consultant Paediatrician; Denise Pemberton, Feeding Lead for Maternity and Neonatal Services; Rachel Pidcock, Lay member; Caroline Roberts, Specialist Health Visitor, Growth and Nutrition; Alison Spiro, Specialist Health Visitor in Infant Feeding; Charlotte Wright, Community Paediatrician; Shirley Paddock (*expert adviser*), Nursery Care Professional

Financial Disclosures/Conflicts of Interest

At the start of the guideline development process all group members declared interests including consultancies, fee-paid work, shareholdings, fellowships and support from the healthcare industry. At all subsequent group meetings, members declared arising conflicts of interest.

Members were either required to withdraw completely or for part of the discussion if their declared interest made it appropriate. The details of declared interests and the actions taken are shown in Appendix C (see the "Availability of Companion Documents" field).

Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Available from the National Institute for Health and Care Excellence (NICE) Web site. Also available for download in ePub or eBook formats from the NICE Web site.

Availability of Companion Documents

The following are available:

Faltering growth: recognition and management of faltering growth in children. Full guideline. London (UK): National Institute for Health and Care Excellence (NICE); 2017 Sep. 182 p. (NICE guideline; no. 75). Available from the National Institute for Health and Care Excellence (NICE) Web site.

Faltering growth: recognition and management of faltering growth in children. Appendices. London (UK): National Institute for Health and Care Excellence (NICE); 2017 Sep. (NICE guideline; no. 75). Available from the NICE Web site.

Faltering growth: recognition and management of faltering growth in children. Baseline assessment tool. London (UK): National Institute for Health and Care Excellence (NICE); 2017 Sep. (NICE guideline; no. 75). Available from the NICE Web site.

Faltering growth: recognition and management of faltering growth in children. Resource impact statement. London (UK): National Institute for Health and Care Excellence (NICE); 2017 Sep. (NICE guideline; no. 75). Available from the NICE Web site.

Developing NICE guidelines: the manual. London (UK): National Institute for Health and Care Excellence (NICE); 2014 Oct. Available from the NICE Web site.

Patient Resources

The following is available:

Faltering growth: recognition and management of faltering growth in children. Information for the public. London (UK): National Institute for Health and Care Excellence (NICE); 2017 Sep. (NICE guideline; no. 75). Available from the National Institute for Health and Care Excellence (NICE) Web site.

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NGC Status

This NGC summary was completed by ECRI Institute on October 25, 2017. The guideline developer agreed to not review the content.

This NEATS assessment was completed by ECRI Institute on November 3, 2017. The information was verified by the guideline developer on December 5, 2017.

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